United Nations ECE/ENERGY/GE.6/2018/4

Economic and Social Council

Distr.: General
23 August 2018

Original: English

Economic Commission for Europe

Committee on Sustainable Energy

Group of Experts on Energy Efficiency

Fifth session
Kiev, 13–15 November 2018
Item 4 of the provisional agenda
Exchange of experience on standards and guidelines to improve significantly energy efficiency in buildings

Exchange of experience on standards and guidelines to improve significantly energy efficiency in buildings

Background paper on main findings of the study on mapping of energy efficiency standards in buildings in the ECE region

Note by the secretariat

I. Background information

1. The Committee on Sustainable Energy and the Committee on Housing and Land Management established the Joint Task Force on Energy Efficiency Standards in Buildings in 2015. In 2017–2018, projects in support of implementation of tasks by the Joint Task Force are funded by the Governments of Denmark and the Russian Federation and by the Black Sea Economic Cooperation Organization (BSEC). One of the implemented activities of the Joint Task Force is a study on mapping of energy efficiency standards in buildings in the United Nations Economic Commission for Europe (ECE) region.

2. The study was carried out from November 2017 to July 2018 and was discussed, reviewed, and validated during the first and second meetings of the Joint Task Force, respectively in Geneva on 1 November 2017 and in Yerevan, Armenia on 14–15 April 2018. This document presents the main findings of the study.

3. Existing building energy standards in the ECE region vary from voluntary guidelines to mandatory requirements, which may apply to one or many building types. Their development is typically a complex decision-making process that can involve several stakeholders. Building energy standards are difficult to classify and the standards that are

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stringent for one country may be ineffective in another country, depending on climate conditions, occupant behaviour, existing building stock, and construction practices.

4. A decision to develop a study on mapping of existing energy efficiency standards and technologies in buildings in the ECE region was made in response to these challenges and for a better understanding of the status of deployment and implementation of energy efficiency standards in buildings in the ECE region.

5. The objectives of this study are to identify which energy efficiency standards in buildings the ECE member States are using and also to evaluate the most effective policies and highlight the best practices to help countries learn from each other and achieve greater savings. The study provides a snapshot of the legal status and coverage of building energy standards in 56 member States and lays out the status of their stringency, technical requirements, enforcement and compliance, and use of energy efficient building materials and products in selected countries of the ECE region. It highlights some national best practices for the above elements. With the exception of a few countries, all countries have now embedded regulations for newly constructed and renovated residential and non-residential buildings.

II. Methodology

6. The study was carried out in four inter-related steps: data collection on the status of energy efficiency standards and technologies in buildings in the ECE region using a survey, complemented by desktop research and stakeholder consultations; analysis of the survey results; gap analysis of the building energy codes effectiveness; and initial assessment of energy efficient technologies in buildings in relation to the existing standards.

7. The analysis of the survey results was carried out for the ECE region with disaggregation by the sub-regions:

A. European Union (EU) Member States prior to 2004 (EU15)[1], Norway, and Switzerland;

B. EU enlargement - the 13 countries that joined the EU after 2004 (EU13)[2];

C. Eastern Europe, the Caucasus, Central Asia, and the Russian Federation[3];

D. North America[4]; and

E. South-Eastern Europe[5].

8. The following countries were not included in this study due to the lack of information available: Cyprus, Malta, Iceland, Liechtenstein, Andorra, Monaco, San Marino, Israel and Turkey.

9. Data collected from the survey responses was complemented by the results of the online research of already published documents. It was analyzed and presented in a tabular form for selected countries from all sub-regions across individual metrics to provide a comparative gap analysis of energy efficiency standards in buildings in the ECE region.

[1] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.

[2] Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia.

[3] Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

[4] Canada and United States.

[5] Albania, Bosnia and Herzegovina, Montenegro, Serbia, and the former Yugoslav Republic of Macedonia.

This analysis also includes case studies and highlights the best practices in countries from different sub-regions.

III. Main findings

10. The analysis of the coverage and stringency of building energy codes across the ECE region indicates that some countries still apply building energy codes only to specific types of buildings, such as single- or multifamily buildings in the residential sector. For example, Azerbaijan and Kazakhstan do not currently have provisions to cover single-family buildings. Building energy codes in Georgia cover only new residential buildings while in the Republic of Moldova they cover only existing residential and commercial buildings.

11. It has been noted that while many member States have now technical requirements in place in their building energy codes, there is still a small number of countries which are yet to implement requirements on heating, cooling, lighting and ventilation.

12. The results of the gap analysis also pointed to a large disparity between the Energy Performance Certification (EPC) implementation across the ECE member States, with sub-region C lagging behind on the use, stringency and coverage, as well as the quality and monitoring of the EPC. A number of responses and some published studies have indicated that the quality of the EPC is not satisfactory in some countries. There are also some inconsistencies across the ECE member States on the choice and design of the assessment methodology which hinders the EPC implementation process. The successful implementation of the EPC is also constrained by a lack of enforcement, training and monitoring mechanisms. In Albania, Belarus, Georgia, Kazakhstan, and the former Yugoslav Republic of Macedonia, the EPC is not used.

13. The results of the survey have indicated also a lack of knowledge, inconsistencies in statistics and a lack of appropriate studies related to the energy performance gap. This suggests one or more of the following issues: the calculation methods are flawed, the enforcement regime is not being undertaken sufficiently rigorously, or designers and builders are failing to satisfactorily deliver the outcome intended. Closing the energy performance gap between design intent (and regulatory requirement) and the actual performance is likely to become an important issue over the next decade if countries are to deliver the climate and environmental targets related to buildings. In Switzerland, for example, this is currently being researched, with initial findings suggesting a 30-300 percent gap measured compared to predicted energy performance in residential buildings. Albania reports that there is a 30-40 percent energy performance gap, while the former Yugoslav Republic of Macedonia reports that energy performance gap is not currently recorded and only predicted/calculated energy performance is being used.

14. The gap analysis also suggests that compliance and enforcement of building energy codes are being undertaken with less rigor and attention to detail in some countries. Specific incentives and enforcement mechanisms are currently not widely used in building energy codes in countries in sub-region C. Azerbaijan, Albania, Belarus, Croatia, Kazakhstan, Montenegro, Republic of Moldova, Russian Federation, Serbia, Turkmenistan, and Ukraine do not have provisions for incentives for improving compliance in their building energy codes.

15. Although most of the countries have now inspection schemes for boilers and/or air conditioning systems, data collection on the number of inspections done by each member State is still at a very low level. Insufficient data makes it difficult to make proper assessment of the effectiveness of these schemes. A number of countries, e.g. Finland,

France, Ireland, the Netherlands, Slovenia, Sweden, and the United Kingdom do not include requirements for inspection of boilers.

16. Some countries still show a low level of implementation of requirements for the use of energy efficient materials and products, with some countries being more stringent than others when it comes to materials certification and testing. A number of countries from sub-regions C and E, e.g. Albania, Georgia, Republic of Moldova, Turkmenistan, Ukraine, and the former Yugoslav Republic of Macedonia, show a relatively low level of implementation for this metric, while other countries, e.g. Bosnia and Herzegovina, Kazakhstan, Montenegro, the Russian Federation, Serbia, and Uzbekistan, include requirements for the use of certified energy efficiency materials and products in their building energy codes.

17. A preliminary analysis of deployment of energy efficient technologies in countries of the ECE region demonstrates that a number of countries has achieved significant progress, resulting from a holistic and consistent policy approach to developing and implementing building energy codes with the support of effective financial and enforcement mechanisms. A significant improvement has been noted in increasing energy efficiency of heating and cooling equipment in many countries, however, market maturity for high-priority building envelope components varies significantly between the countries of the ECE region.

18. Many countries, particularly countries of sub-region C, still have difficulties in increasing the deployment of energy efficient technologies in the market. This may stem from the wrong signals sent by incoherent polices on financial incentives, lack of consumer awareness of the benefits of such technologies, insufficiently developed building energy codes, and lack of technical expertise, all of which have negative impacts on the energy efficient technology cost reduction, ease of installation and market conditioning.

IV. Recommendations

19. *Recommendation 1:* ECE member States should continue the process of harmonization of building energy codes by ensuring comprehensive coverage of all types of buildings[6] in their regulations.

20. *Recommendation 2:* ECE member States should lay down the necessary measures to include a national energy efficiency target, based either on primary or final energy consumption, or on primary or final energy savings, or on energy intensity.

21. *Recommendation 3:* ECE member States, to continue the process of harmonization through further strengthening the requirements for insulation, ventilation and technical installations, should:

(a) Give more attention to air-tightness of the envelope;

(b) Ensure inclusion of the requirements for air conditioning, lighting, active solar, renewables and natural lighting;

(c) Make mandatory the requirement for the inspection of boilers and air-conditioning systems to improve the quality and precision of Energy Performance Certificates in collective dwellings;

[6] Includes new and existing residential and non-residential buildings, single family, apartments, commercial and public buildings.

(d) Follow a holistic approach in building energy codes based on overall building performance, including requirements for technical systems such as heating, ventilation, and air conditioning (HVAC) and lighting.

22. *Recommendation 4:* ECE member States should consider introducing or strengthening quality assurance measures, especially during the early stage of the certification process:

(a) The requirements for the qualified experts should be harmonized across the countries of the ECE region;

(b) The certifier needs to be physically present onsite;

(c) There is a need to further harmonize the quality check of the EPC;

(d) Facilitate harmonization of the EPC through integration of ventilation, cooling and lighting into the certificate; and

(e) Need for guidance in development of the centralized EPC databases and digitalization of the EPC process.

23. *Recommendation 5:* ECE member States should consider making the challenges of the energy performance gap in existing buildings and data collection on actual energy use to be a priority area for research in the respective country.

24. *Recommendation 6:* ECE member States should establish or strengthen proper (electronic) monitoring systems of compliance, enforcement and quality control processes through the qualified experts to ensure compliance with building energy codes and standards.

25. *Recommendation 7:* ECE member States should lay down the necessary measures to establish a regular inspection of boilers and air conditioning systems in building energy regulations.

26. *Recommendation 8*: ECE member States should lay down the necessary measures to continuously monitor, analyse, and adjust energy usage in building energy codes.

27. *Recommendation 9:* ECE member States, particularly countries with economies in transition, should consider creating incentives for improving energy efficiency through appropriate policies, tax incentives and low-interest loans for energy efficiency projects.

28. *Recommendation 10:* ECE member States should introduce the necessary measures in building energy codes to facilitate the process of harmonization of energy efficient materials and products testing and certification using best practices employed by other countries of the ECE region. When developing and harmonizing building energy codes in lower-middle income economies of the ECE region, regard should be given to the types of construction that these countries can afford. This will ensure that building energy codes effectively promote production of local traditional materials, research and development for improving local traditional techniques, materials testing, and quality control, and do not create dependency on imported building materials that may stifle local innovation.

29. *Recommendation 11:* ECE member States should introduce the necessary measures in building regulations to ensure that the materials and products used in construction are subject to rigorous quality control processes to meet the requirements for energy efficiency while maintaining robust combustion performance, fire resistance test, and seismic resistance, ensuring they do not cause threat to the safety of people and property.

30. *Recommendation 12:* ECE member States should consider funding collaborative international research to assist in the establishment of new harmonized building materials

test mechanisms and to ensure that independent organizations beyond the manufacturing community can play a key role in developing market-neutral procedures.

31. *Recommendation 13:*

(a) ECE member States, particularly countries with economies in transition, should consider improving transparency in information access and exchange by making full-featured versions of their building energy codes accessible and available free of charge with the applicable calculation methods on the relevant websites;

(b) ECE member States, especially neighbouring countries who have already developed their building energy codes in detail and are at the stage of their practical implementation with real positive effects, should provide methodological assistance and other types of assistance to countries in need of such development;

(c) ECE member States, particularly countries with economies in transition, should consider developing common approaches to building energy codes reflecting specifics of energy exporting and energy importing countries.

32. *Recommendation 14:* ECE member States should introduce the necessary policies based on well-founded identification of the energy efficient technology options that can best assist national energy objectives and carry out an in-depth review of economic and non-economic barriers to progress as a baseline for future policies in their respective countries.

33. *Recommendation 15:* ECE member States, particularly countries with economies in transition, should introduce the necessary policies to increase awareness and understanding of the national and local authorities, property developers, and national and international financial institutions about the feasibility of significant investments in EE technologies.

34. *Recommendation 16:* ECE member States, particularly countries with economies in transition, should introduce the necessary policies to educate government officials at the national and municipal levels on the business environment necessary to attract investments in energy efficiency in buildings and how to translate private sector requirements into effective policy measures and/or government initiatives.

35. *Recommendation 17:* ECE member States should introduce the necessary policies to facilitate the deployment of energy efficient technologies in the market place by improving coherence of the programmes for energy efficient technologies and other government policies to meet public policy goals.

United Nations ECE/ENERGY/GE.6/2018/5–ECE/ENERGY/GE.7/2018/5

Economic and Social Council

Distr.: General
29 August 2018

Original: English

Economic Commission for Europe

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Group of Experts on Energy Efficiency
Fifth session
Kiev, 13–15 November 2018
Item 6 of the provisional agenda
Regulatory and policy dialogue addressing barriers to improve energy efficiency and renewable energy

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Regulatory and policy dialogue addressing barriers to improve energy efficiency and renewable energy

Background paper on progress in the areas of energy efficiency and renewable energy in selected countries of South-Eastern Europe, Eastern Europe, and Central Asia, and in Russian Federation

Note by the secretariat

I. Background information

1. A number of legislative, policy, economic, and financial barriers to significant improvements in energy efficiency and increased uptake of renewable energy remain. It is important to identify policies and measures that reduce barriers to increasing investment and financing flows to energy efficiency and renewable energy projects, with an emphasis on commercial projects and private financing. A valuable aspect is transferability of successful measures in selected countries to other United Nations Economic Commission for Europe (ECE) member States. Particular attention needs to be given to the reasons why energy efficiency improvement and uptake of renewable energy are lagging behind what is necessary to achieve climate objectives and sustainable development goals.

2. In the period of 2007–2014, ECE was executing project Financing Energy Efficiency and Renewable Energy Investments for Climate Change Mitigation. The long-

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term objective of the project was to promote an investment climate in which self-sustaining energy efficiency and renewable energy projects can be identified, developed, financed and implemented. The project achieved most of its objectives and the final project report has been prepared. It provided a basis for the analysis of developments occurred in the beneficiary countries in the period from 2010 to present days. This background paper presents main findings and outcomes of the final report of the project.

II. Main objectives and methodology of the report

3. The report looks at policy, regulatory and institutional reforms; capacity of stakeholders in the countries; best practices developed and introduced; and awareness raising aimed at improving investments into energy efficiency and renewable energy. It also looks at the processes in the area of energy efficiency and renewable energy, which are particularly beneficial for the countries and can be recommended for replication and scaling up. It highlights the existing gaps related to energy efficiency and renewable energy in the areas of policy, regulatory and institutional frameworks, financial environment, and education and awareness.

4. The geographic focus of the report is selected ECE member States from South-Eastern Europe, Eastern Europe, and Central Asia, which were beneficiary countries of the project mentioned in para. 2. These are Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Serbia, and the former Yugoslav Republic of Macedonia (South-Eastern Europe), Belarus, Republic of Moldova, and Ukraine (Eastern Europe), Kazakhstan (Central Asia), and Russian Federation.

5. The survey on progress in the areas of energy efficiency and renewable energy since 2010 in the selected countries was conducted over the period of 1 March – 30 April 2018. It was addressed to the responsible authorities for energy efficiency and renewable energy in these countries. The survey was made available in English and Russian. Evaluation of responses from the countries was complemented by a desk research to assess overall progress in the areas of energy efficiency and renewable energy in the selected countries.

III. Progress in the policy area to promote energy efficiency and renewable energy

6. According to the study, most of the countries have adopted the dedicated framework legislation on energy efficiency and renewable energy. Since 2010, legislation on energy efficiency and energy saving has been adopted in Albania (2015), Belarus (2015), Bosnia and Herzegovina (both in Federation of Bosnia and Herzegovina and in Republika Srpska in 2013), Bulgaria (2016), Croatia (2014), Kazakhstan (2014), Republic of Moldova (2010), Russian Federation (2009 with latest amendment in 2014), Serbia (2013), and Ukraine (2017).

7. The laws on renewable energy have been adopted in Albania (2017), Belarus (2010), Bosnia and Herzegovina (in both entities in 2013), Bulgaria (2011, amended in 2017), Croatia (2015, amended in 2017), Kazakhstan (2013), Republic of Moldova (2016, amended in 2017), and Ukraine (2003 with the latest amendment in 2017).

8. The Energy Development Strategies until 2030 have been developed and adopted in Albania (2018), Bosnia and Herzegovina (Republika Srpska in 2012), Bulgaria (2011), Croatia (draft of 2017), Republic of Moldova (2013), Russian Federation (2009), Ukraine (2017), and the former Yugoslav Republic of Macedonia (2010).

9. The National Energy Efficiency Action Plans (NEEAP) have been developed in Albania (2017), Bosnia and Herzegovina (Federation of Bosnia and Herzegovina in 2017), Bulgaria (fourth NEEAP adopted in 2017), Croatia (fourth NEEAP adopted in 2017), Republic of Moldova (second NEEAP adopted in 2016), Serbia (third NEEAP adopted in 2016), Ukraine (2015), and the former Yugoslav Republic of Macedonia (second NEEAP adopted in 2017).

10. The National Renewable Energy Action Plans (NREAP) have been developed in Albania (2016), Bosnia and Herzegovina (Federation of Bosnia and Herzegovina in 2014), Bulgaria (2012), Croatia (2013), Kazakhstan (2013), Republic of Moldova (2013), Serbia (2013), Ukraine (2014), and the former Yugoslav Republic of Macedonia (2015, amended in 2017).

11. Development of the secondary legislation was boosted in all selected countries since 2010. Comprised of various types of by-laws produced by different governmental bodies, the adopted secondary legislation includes Presidential decrees, Governmental resolutions and decrees, resolutions of National Commissions, rulebooks, ordinances, regulations, specific decisions and rules. Norms, standards and technical regulations are completing the regulatory framework related to energy efficiency and renewable energy in the countries.

12. The institutional framework is formed by the institutions at the national and local levels acting in the areas of energy efficiency and renewable energy in the selected countries. The energy agencies are established in Albania, Bulgaria, Croatia, Republic of Moldova, Russian Federation, Ukraine, and the former Yugoslav Republic of Macedonia.

IV. Progress in building capacity to promote energy efficiency and renewable energy investments

13. The study indicates that the countries enhanced capacity of stakeholders in different sectors. The activities which helped improving capacity of authorities in the public sector included organization of trainings of staff in the ministries, governmental agencies and municipalities; conferences on energy efficiency and renewable energy policies and project development. international fora on sharing knowledge and experiences in energy efficiency and renewable energy areas; licensing programmes for engineers; trainings on energy management; as well as knowledge transfers among managers at the middle and senior levels.

14. The capacity building activities for stakeholders in utilities, energy service companies (ESCOs), consulting firms, and energy audit companies, among others, included trainings on energy efficiency and renewable energy for energy producing and consulting companies; explanation of regulations and procedures for ESCOs; introduction of the management system and standards for consulting companies; as well as international exhibitions and fora for introduction of the eco-friendly technologies.

15. The activities that helped the end-users included development of the support programmes for financing in industry and residential sector; introduction of energy management process in the residential system; adoption of programmes for energy renovation of single-family houses and multi-apartment buildings; organization of international conferences to promote energy efficiency measures and use of renewable energy.

16. The activities, which enhanced capacity for energy efficiency and renewable energy investments within the financial services, included dissemination of information on the available international technical assistance programmes for energy efficiency and renewable energy projects; dissemination of information on possibilities for commercial

and non-commercial project financing; transfer of know-how and thematic expertise among bigger banking groups; technical assistance for project development and financing for financial service companies and project developers; and organization of various capacity building events.

V. Progress in developing and introducing best practices to energy efficiency and renewable energy investments

17. Implementing effective policies and measures plays important role in better realizing the potential of energy efficiency and uptake of renewable energy in the countries. The best policy practices in the countries under review can be seen in adoption of relevant energy efficiency and renewable energy regulations and establishing institutional structures based on the territorial-sectoral principle; adoption and update of the national energy efficiency and renewable energy action plans; establishment of energy efficiency funds for financing of programmes and projects in the area of energy efficiency and renewable energy; introduction of energy management systems; and establishing the feed-in support schemes for renewable energy and ESCO contracts in the public sector.

18. The best practices in project development, among others, include carrying out the energy audits, introduction of feed-in tariffs for electricity generation from the renewable energy installations; operation of energy efficiency co-financing programmes; operation of the budgetary fund for energy efficiency; introduction of support schemes for installation of solar water heaters, replacement of windows, and other energy efficiency and renewable energy measures.

19. The best approaches to investments into energy efficiency and renewable energy in the selected countries were the adoption of by-laws to support the investments; establishment of national energy efficiency and renewable energy funds; implementation of co-financing options for promoting energy efficiency investments; and introduction of the auction system as a renewable energy support mechanism.

VI. Progress in energy efficiency and renewable energy project development and financing

20. Initiatives by governments in the countries are identified in adoption and implementation of the state programmes and establishment of specialized funds, such as the State Programme "Energy Saving" in Belarus; Environmental Protection and Energy Efficiency Fund of the Republika Srpska and Environmental Fund of the Federation of Bosnia and Herzegovina (both in Bosnia and Herzegovina); the Environmental Protection and Energy Efficiency Fund in Croatia; the State Programme "Energy Efficiency and Energy Development" in the Russian Federation; Energy Efficiency Budgetary Fund in Serbia; and the support scheme for installation of solar water heaters by the Ministry of Economy in the former Yugoslav Republic of Macedonia.

21. Among the existing financing schemes and mechanisms, the countries established funds of the national and local budgets, introduced special environmental fee on registration of motor vehicles, are using the structural funds of the European Union for stimulating energy efficiency and renewable energy projects, introduced the "green tariffs", and provided tax incentives.

22. Various instruments were used for financing of energy efficiency and renewable energy projects. They vary, for example, from credit financing and loans in Belarus and Bosnia and Herzegovina to grants in Ukraine and the former Yugoslav Republic of

Macedonia. Commercial loans through local banks and microcredit foundations in Bosnia and Herzegovina offer the end-users more favorable terms (lower interest rates) than standard commercial loans.

23. Technical assistance for project financing is usually provided through allocation of grant funds to bring viable energy efficiency and renewable energy projects to bankability to enable financing from domestic and international financial institutions, development banks, commercial banks and other sources of debt or equity financing. The World Bank, United Nations Development Programme (UNDP), International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD), European Union (EU), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), United States Agency for International Development (USAID), European Investment Bank (EIB), Kreditanstalt für Wiederaufbau (KfW), and Global Environment Facility (GEF) are among the most active international institutions providing technical assistance in these countries. International donors and development banks continue to be an important source of debt financing and grants for energy efficiency and renewable energy projects.

24. The development of the energy service market in the countries varies significantly. The ESCO market is in the development or initial phase in Belarus, Bosnia and Herzegovina, and the former Yugoslav Republic of Macedonia, while being more developed in Croatia, Russian Federation, Serbia, and Ukraine.

VII. Processes in the area of energy efficiency and renewable energy beneficial for the countries

25. The study also looks at the processes led by ECE and other United Nations Regional Commissions in the area of energy efficiency and renewable energy, which are particularly beneficial for the countries and can be recommended for replication and scaling up. The identified processes include several internationally implemented projects, conducted events and prepared publications in the period of 2012-2017.

26. The project "Promoting Energy Efficiency Investments for Climate Change Mitigation and Sustainable Development", implemented by ECE (lead agency) in collaboration with the other United Nations Regional Commissions (Economic and Social Commission for Asia and the Pacific (ESCAP), Economic and Social Commission for Western Asia (ESCWA), Economic Commission for Africa (ECA), and Economic and Social Commission for Latin America and the Caribbean (ECLAC)) in 2012-2014, conducted several workshops and other capacity building activities. The project combined technical assistance in design and implementation of investment projects, advice on policy and institutional reforms, and direct links with financial institutions (banks and investment funds) to establish mechanisms, which were able to fast-track the development of self-sustained markets for energy efficiency.

27. The project "Promoting Renewable Energy Investments for Climate Change Mitigation and Sustainable Development", implemented by ESCWA (lead agency) in collaboration with ECE in 2015-2017, conducted trainings of experts at the national and municipal levels in project development, finance and business; developed case studies on experience of policy reforms in the countries; developed an investment project pipeline and provided further assistance to project developers.

28. The project "Energy Efficiency Standards in Buildings in the UNECE Region", under joint implementation by the Sustainable Energy Division and Forests, Housing and Land Management Division of ECE in 2017-2018, is focused on improving energy efficiency in buildings and reducing global greenhouse gas emissions from buildings in the

ECE region through improved knowledge of policy makers and building sector professionals in application of high-performance energy efficiency building standards.

29. The annual International Forum on Energy for Sustainable Development, organized since 2010, has made major contributions to the global dialogue on implementing the Sustainable Energy for All initiative and achieving targets of the Sustainable Development Goal (SDG) 7 on affordable and clean energy.

30. In 2014, the ECE Group of Experts on Energy Efficiency was established with mandate to carry out activities that help significantly improve energy efficiency in the region, including, in the selected countries. Also in 2014, the ECE Group of Experts on Renewable Energy was established and mandated to carry out activities that help significantly increase the uptake of renewable energy in the region and help achieve the objective of access to energy for all in the ECE region.

31. Renewable Energy Hard Talks have been organized within GERE work in member States (Georgia, Ukraine, Azerbaijan and Kazakhstan in 2017-2018) on new possibilities for developing sustainable energy and promoting renewable energy investments. The Hard Talks promote demand-driven debate directly in the countries on what is needed to change to allow the private sector to invest in sustainable energy and substantially increase the uptake of renewable energy. In the framework of the International Forum on Energy for Sustainable Development, a dedicated Matchmaking event has been organized since 2016 to promote renewable energy investments.

32. A number of analytical policy studies to assess the progress in energy efficiency and renewable energy policies and investments have been prepared, namely:

- Analysis of National Case Studies on Policy Reforms to Promote Energy Efficiency Investments (2015)
- Best Policy Practices for Promoting Energy Efficiency (two editions, 2015 and 2017)
- UNECE Renewable Energy Status Report (two editions, 2015 and 2017)
- Experience in the Europe and CIS Region with Clean Energy – UNDP, GEF and UNECE (2016)
- Overcoming Barriers to Investing in Energy Efficiency (2017)
- Global Tracking Framework: UNECE Progress in Sustainable Energy (2017)
- Status and Perspectives for Renewable Energy Development in the UNECE Region 2017 (2018)

VIII. Remaining gaps related to energy efficiency and renewable energy in the countries

33. The study highlights the existing gaps related to energy efficiency and renewable energy in the areas of policy, regulatory and institutional frameworks, and financial environment.

34. In the policy area, the framework legislation on energy efficiency is not adopted in the former Yugoslav Republic of Macedonia. The legislation on renewable energy does not exist in the Russian Federation, Serbia, and the former Yugoslav Republic of Macedonia. Energy development strategies have not been adopted in Belarus, Kazakhstan, and Serbia. Some project countries also do not have National Energy Efficiency and Renewable Energy Action Plans. NEEAP has not been adopted in Belarus, Kazakhstan, and Russian

Federation. NREAP has not been adopted in the Russian Federation. Secondary legislation is far less developed and adopted in the project countries. Development of the dedicated secondary legislation needs more attention and further actions from the policy makers' side.

35. The governmental institutions responsible for energy efficiency and renewable energy in the reviewed countries are mostly represented only at the national level. Even when local institutions exist they are often not functioning effectively. The dedicated agencies and intermediate management structures that deal with energy efficiency and renewable energy have not been established in Bosnia and Herzegovina, Kazakhstan, and Serbia.

36. The financial environment for investments in energy efficiency projects remains risky due to low energy tariffs and energy subsidies in many countries, which do not provide investors with attractive rates of return on their investments.

37. To promote investments in renewable energy, some countries introduced feed-in tariffs or premiums. However, official expansion goals were not introduced in Belarus. Investment incentives, subsidies and benefits do not exist in the Republic of Moldova. Green certificates are not present in any of the reviewed countries. Auctions are introduced only in the Russian Federation. Renewables portfolio standards or quota system exists only in Belarus. Guaranteed grid access for electricity generated from renewable energy sources exists only in a few countries. None of the countries have net metering and net billing.

38. Commercial financing lacks incentives, while the investments in the countries are mainly driven by international donors and development banks in the form of debt financing or grants from the World Bank, EBRD, and KfW. The important lenders for countries in South-Eastern Europe are also the European Commission, the Council of Europe Development Bank, and EIB.

IX. Conclusions and recommendations on policies and actions to increase financing into energy efficiency and renewable energy

39. The study examined policy, regulatory and institutional reforms to promote energy efficiency and renewable energy in the selected countries. Bulgaria and Croatia, as members of the European Union, were required to transpose the EU Directives' provisions into their national laws to ensure major energy savings for both consumers and industry. Albania, Bosnia and Herzegovina, Republic of Moldova, Serbia, Ukraine and the former Yugoslav Republic of Macedonia are the contracting parties of the Energy Community and made legally binding commitments to adopt the EU energy legislation which boosted the development of policy, legislative and regulatory frameworks in these countries. Belarus, Kazakhstan and the Russian Federation also achieved significant progress in the areas of energy efficiency and renewable energy since 2010.

40. The countries also made progress in the capacity building process to promote energy efficiency and renewable energy investments. National and local authorities, project developers and owners as well as financial institutions gained knowledge about new technologies, new financial instruments and ways of attracting investments in energy efficiency and renewable energy. The capacities of public institutions and the private sector in development of energy efficiency and renewable energy projects were increased from financial assessment and bankability conditions point of view.

41. Since 2010, the countries developed and introduced certain best policy practices and practices in project development, best approaches to investments into energy efficiency and renewable energy and innovative financing mechanisms that allowed increasing

investments into the areas. The existing processes in the area of energy efficiency and renewable energy, including implementation of the international projects, organization of events and conduct of research also facilitated the countries' progress in the areas of energy efficiency and renewable energy.

42. Despite achieved progress, the study also highlighted existing gaps related to energy efficiency and renewable energy in the areas of policy, regulatory and institutional frameworks, and financial environment, and education and awareness in the countries. To address the existing gaps, the study proposes the following recommendations:

- National Energy Efficiency Action Plans should be adopted in those countries that have not done so yet (Belarus, Kazakhstan, and the Russian Federation). A National Renewable Energy Action Plan should be adopted in the Russian Federation.
- Policy makers from the selected countries should focus more on development and subsequent enforcement of the secondary legislation on energy efficiency and renewable energy.
- Development and implementation of policies related to energy efficiency and renewable energy should be coordinated at the national, regional (provincial), and local levels. Absence of such coordination often leads to ineffectiveness of the adopted policies in the countries.
- All relevant stakeholders (policy makers, business community, financial institutions, academia, and civil society) should be brought into the process of formulation of energy efficiency and renewable energy policies. This would help in developing consensus and facilitating future implementation of policies.
- The ongoing nature of policy development requires consistent and sustained introduction of new measures and their constant improvement. To achieve the national targets, the governments should introduce new regulations, update the existing ones and constantly monitor their implementation.
- In order to be effective, energy efficiency and renewable energy related policies should be predictable and consistent in the long term. They also have to be aligned with the existing energy market structure and coordinated with other existing policies.
- The dedicated governmental institutions or agencies should be created in those countries where they do not exist yet to ensure implementation of energy policy in the country, improvements in energy efficiency, and increased uptake of renewable energy.
- Further work needs to be done to improve investment climate for energy efficiency and renewable energy projects. Efforts to attract investments in this area should become a special focus for governments.
- The countries should concentrate more on introducing incentives (financial and non-financial) and supporting schemes for energy efficiency and renewable energy investments.
- Energy subsidies should be eliminated in the countries (while ensuring that the level of energy poverty does not increase, and that vulnerable population has access to affordable and clean energy) as they discourage energy efficiency and renewable energy investments and do not provide investors with the opportunity to receive expected rate of return on their investments.

- Additional efforts should be made in the countries to reduce perception of the commercial financial institutions that financing of energy efficiency and renewable energy projects carry high risks.
- Awareness raising should be one of the priorities for the national authorities to avoid obstacles to promoting energy efficiency and renewable energy.
- Information exchange activities and trainings should become an integral part of energy efficiency and renewable energy development strategies.
- The international development agencies working in the countries can provide significant benefits through supporting activities aimed at increasing public awareness of energy efficiency measures and use of renewable energy sources through public campaigns and pilot projects.